

Claims

[c1] What is claimed is:

1.A plasma torch assembly comprising:
a torch body having a handle portion and a tip portion;
an electrode disposed in the tip portion of the torch
body; and
a retaining cup constructed to encircle the electrode in
the torch body and connect to the tip portion with less
than approximately 180 degrees rotation relative to the
torch body.

[c2] 2.The plasma torch assembly of claim 1 further comprising

an L-shaped groove formed in at least one of the re-
taining cup and the tip portion of the torch body.

[c3] 3.The plasma torch assembly of claim 2 further compris-

ing a pin extending from at least one of the retaining
cup and the tip portion of the torch body and con-
structed to engage the groove.

[c4] 4.The plasma torch assembly of claim 1 further compris-

ing a shield connectable to the retaining cup generally
opposite the tip portion of the torch body.

- [c5] 5.The plasma torch assembly of claim 4 wherein the shield is at least one of a drag shield and a gouging shield.
- [c6] 6.The plasma torch assembly of claim 1 further comprising a swirl ring disposed generally between the electrode and the tip portion of the torch body.
- [c7] 7.The plasma torch assembly of claim 1 wherein the retaining cup is fully connectable to the tip portion of the torch body by approximately 90 degrees of rotation therebetween.
- [c8] 8.The plasma torch assembly of claim 1 wherein the plasma torch assembly is any one of a contact start plasma torch, a high-frequency start plasma torch assembly, and a high voltage start plasma torch assembly.
- [c9] 9.The plasma torch assembly of claim 1 further comprising a cable having a first end connected to the plasma torch assembly and a second end connectable to a power source.
- [c10] 10.A plasma cutter comprising:
 - a power source configured to condition power into a form usable by a plasma cutting process;
 - a torch connected to the power source and configured to effectuate the plasma cutting process;

an electrode disposed in the torch; and
a cup having a twist-lock quick-connect mechanism re-
movably connecting the cup to the torch and constructed
to maintain an operable position of the electrode and
prevent overtightening of the cup to the torch.

- [c11] 11. The plasma cutter of claim 10 further comprising a pin and channel engagement between the cup and torch constructed to limit rotation therebetween to less than approximately 360 degrees.
- [c12] 12. The plasma cutter of claim 10 further comprising a swirl-ring disposed between the electrode and the torch and constructed to direct a flow of gas therethrough.
- [c13] 13. The plasma cutter of claim 10 further comprising a shield connected to the cup.
- [c14] 14. The plasma cutter of claim 10 wherein the twist-lock mechanism is constructed to provide complete engagement within a single-grip rotation.
- [c15] 15. The plasma cutter of claim 10 further comprising a pin extending from one of the cup and the torch and constructed to engage a groove formed in another of the cup and the torch.
- [c16] 16. The plasma cutter of claim 10 wherein the torch is

one of a contact start torch, a high-frequency start torch, and a high-voltage start torch.

- [c17] 17. A plasma torch assembly comprising:
 - a torch body;
 - an electrode;
 - means for connecting the electrode to the torch body having a fully engaged position with less than one complete rotation of the means from an unlock position to a lock position.
- [c18] 18. The plasma torch assembly of claim 17 wherein the fully engaged position of the connecting means is approximately 90 radial degrees from the initial position.
- [c19] 19. The plasma torch assembly of claim 17 wherein at least one of the torch body and the connecting means includes a groove constructed to engage a pin on another of the torch body and the connecting means.
- [c20] 20. The plasma torch assembly of claim 19 wherein the pin and groove cooperate to prevent overtightening of the connecting means to the torch body.
- [c21] 21. The plasma torch assembly of claim 17 further comprising a cable connecting the plasma torch assembly to a power source configured to generate a power signal applicable to a plasma process.

- [c22] 22.A plasma torch consumable comprising a quick connect cup having a partial-turn engagement mechanism engageable with another engagement mechanism of a plasma torch.
- [c23] 23.The plasma torch consumable of claim 22 wherein the partial-turn engagement mechanism of the quick connect cup is a twist-lock mechanism.
- [c24] 24.The plasma torch consumable of claim 23 wherein the twist-lock mechanism is one of a DINSE-style connector and includes a pin and groove engagement.
- [c25] 25.The plasma torch consumable of claim 23 wherein the twist-lock mechanism prevents overtightening of the quick connect cup to the torch.
- [c26] 26.The plasma torch consumable of claim 22 wherein the partial turn engagement mechanism is defined to have a rotation less than 360 degrees when moved from a disengaged position to an engaged position.
- [c27] 27.The plasma torch consumable of claim 22 wherein the partial turn engagement mechanism is a half-turn engagement mechanism wherein rotation of the quick connect cup relative to the plasma torch fully connects the quick connect cup thereto.

- [c28] 28.The plasma torch consumable of claim 22 wherein the partial-turn engagement mechanism includes one of a groove and a pin and another engagement mechanism is another one of a groove and pin.
- [c29] 29.The plasma torch consumable of claim 22 wherein the partial-turn engagement mechanism includes a thread on each of the quick connect cup and the torch having a stop mechanism preventing rotation past a partial turn of the cup with respect to the torch.